

Endoscopic Management of a Perforated Duodenal Ulcer: A Cohort Study

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ABSTRACT

Introduction: Complicated peptic ulcer is one of the most common abdominal emergencies presenting in our institution settings bringing patients from Eastern Odisha. The high patient load forces us to seek out another standardized method apart from the surgical intervention in our study.

Materials and methods: A cohort study was conducted in a Tertiary Care Hospital with 120 patients after confirmation of a pyloro-duodenal location of the perforated ulcer and allocated to the surgical vs stent group.

Results: Percutaneous drainage was required in fifteen patients due to intra-abdominal abscess (C-D 3). Postoperative leak was observed in six patients and showed leak at leakage test and received a new stent without further complication (C-D 3). Five patients needed postoperative intensive care in the ITU, requiring temporary circulatory and renal support. Unfortunately, three patients in poor condition upon admission did not survive (C-D 5).

Conclusion: Stents had an affirmative role for management in complicated patients of peptic perforation.

Keywords: Duodenal perforation, Endoscopy, Gastroduodenal perforation, Stenting, Upper gastrointestinal endoscopy.

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INTRODUCTION

Historically, the cause of peptic ulcer perforation in the early 1800s was considered as poisoning. Later during the period, when found during autopsy was trifled to be due to the instruments used during the procedure.¹ Baron concluded that duodenal ulcer was discovered through a necropsy at the Middlesex Hospital during the 1850s, recorded in London and New York during the 1860s, followed by a rapid increase.² The incidence of uncomplicated peptic ulcer disease has fallen during the last decades and the incidence of perforated peptic ulcer is also decreasing in the western texts.³ But it doesn't hold true in the Asian side of the world and poses a serious condition with high morbidity and mortality rates varying between 10 and 40%.^{4,5}

MATERIALS AND METHODS

It was a prospective cohort study comprising 120 patients in a Tertiary Care Hospital in Odisha. Patients presenting to the Department of General Surgery aged more than 18 years with free gas under the diaphragm with an endoscopically confirmed duodenal location without any history of abdominal trauma were taken as samples in this study designs. They were randomly allotted into 2 groups

Surgical Group

The patient underwent laparoscopic or open Graham patch omentoplasty according to the surgeon's preference. Routine postoperative management was done. Patients presenting with a leak underwent salvage stent treatment.

Stent Group

A partially covered Nitinol stent was placed with the oral end of the stent placed above the pylorus and the covered part of the stent

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at the perforation site with two bilateral 20 Fr Flank drains placed for percutaneous drainage. All patients were treated with routine postoperative measures.

On postoperative day one, 250 mL of water mixed with 5 mL methylene blue was given orally. If the abdominal drain showed blue fluid, then the patient was further evaluated for stent replacement. The problem of stent migration was dealt with by allowing a liquid diet until stent removal.

Stents were removed in 3–4 weeks after an endoscopic inspection of the target site in uncomplicated patients. Patients showing signs of partial healing had a prolonged stent treatment of 2 weeks.

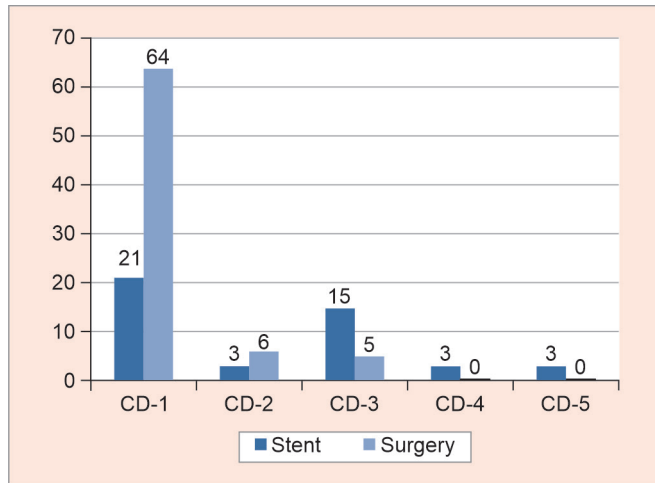
Demographics, ASA grading, median duration of surgery, time to intervention, complications scored along the Clavien-Dindo grades and mean duration of hospital stay were recorded.

Statistics

Non parametric statistical methods were used for most variables. Differences with $p < 0.05$ were considered significant. Data processed using IBM SPSS software.

Table 1: Demographic data

Demographic data	Surgical closure	Stent treatment	All patients
Number	75	45	120
Median age	75 (23–91)	80 (38–87)	77 (23–91)
Gender (M/F)	45/30	21/24	66/54
Median BMI	28 (21–30)	24 (19–30)	27 (19–30)

**Fig. 1:** Complications according to the Clavien – Dindo score

RESULTS

Demographic Data

Most cases were closed surgically of which mostly were male patients with the median age of patients being 75 years. The mean BMI was mostly overweight (Table 1).

ASA Grade

The surgical closure groups individuals had an ASA-score of 1–3. The stent group individuals had an ASA-score of 1–4.

Time to Intervention

A total of 66 out of 120 patients were symptomatic beyond 12 hours out of which 45 out of 75 patients were classified into surgical group and 21 out of 45 patients in the stented group.

Technique of Closure

A total of 45 out of 75 patients had a laparoscopic closure and the rest underwent open surgery.

Median Operation Time

Average time for surgery was 90 minutes and for endoscopic stenting was 60 minutes ($p = 0.002$).

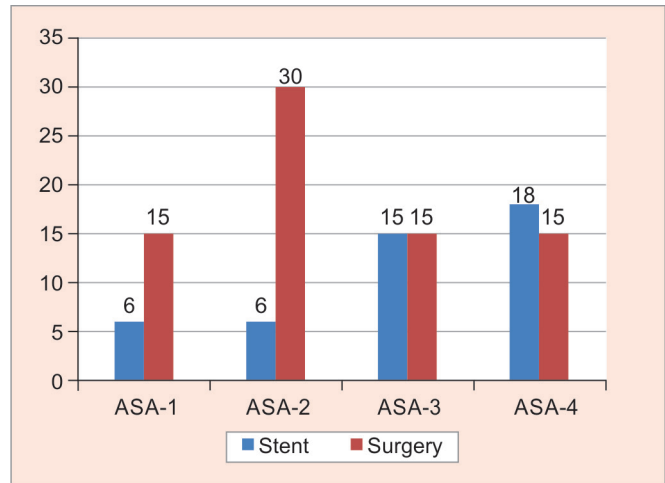
CRP and WBC

No significant differences between the two groups.

Complications

Surgical Group

- Clavien-Dindo-2 complications of postoperative pyrexia were seen in six patients and pneumonia in three patients (Fig. 1).

**Fig. 2:** ASA grade

- Surgical site leak was seen in nine patients who were treated with endoscopic stent placement. Later, the patient developed an intra-abdominal abscess which was aspirated percutaneously (Fig. 1).
- ICU care was required in six patients (C-D 4).

Stent Treatment

- Percutaneous drainage was required in fifteen patients due to intra-abdominal abscess (C-D 3).
- Postoperative leak was observed in six patients and required showed leak at leakage test and received a new stent without further complication (C-D 3) (Fig. 1).
- Postoperative ITU care was required in five patients required temporary circulatory and renal support.
- Three patients presenting in low condition died (C-D 5).

Hospital Stay

Hospital Stay Duration was not different within the 2 groups with 8 days for stent treatment and 7 days for surgery.

Patients presenting late to the hospital beyond 12 hours of symptoms had a prolonged hospital stay (13 days) in comparison to an early presentation (6 days) (p -value < 0.013).

Stent Removal

The stent was removed by 21 days (11–37 days) with no complications.

DISCUSSION

Incidentally, patients with a higher ASA grade ended up in the stented group (Fig. 2), probably indicating its superiority of use in patients presenting in low condition with a prolonged symptomatic period in our study design. We could delineate that the C-D 3–5 group of complications had a statistical correlation to intervention delivered beyond 12 hours of symptoms ($p = 0.004$) (Fig. 1). The mean duration of endoscopic stenting was significant statistically ($p = 0.001$) with lower duration when compared to the surgical group hinting cleverly the importance of less operating duration while dealing with emergency surgeries to minimize morbidity and mortality. Abdominal lavage was a problem in the stent group with 15/45 cases presenting with postoperative Intra-abdominal abscess (Fig. 1). However, it was a minute problem that was dealt with percutaneously with aspiration and conservative

management. In nine patients with postoperative leak, stent treatment was a safe alternative to reoperation with no incidence of stent migration in our study design.

CONCLUSION

After dealing with 120 patients, despite the small sample size (Table 1) and limited access to the stents, we can strongly conclude that the use of partially covered nitinol stents was advantageous in patients presenting with low conditions who are unable to tolerate anesthesia. Those presenting with a postoperative leak after a modified graham patch omentoplasty, history of previous upper gastrointestinal surgery, aberrant perforation site, ASA grades 3–5 had an uneventful recovery with minimal complications. We can imagine a future where surgical patch closure might become outdated by this novel method to reduce the hospital patient burden of complicated peptic ulcers.

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